SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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No. 2053.—Vol. XLIV LONDON, SATURDAY, DECEMBER 26, 1874. PRICE (WITH THE JOURNAL) SIXPENCE. PER ANNUM, BY POST, £1 4s.

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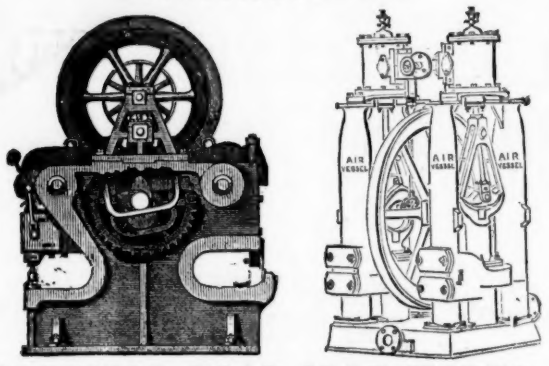

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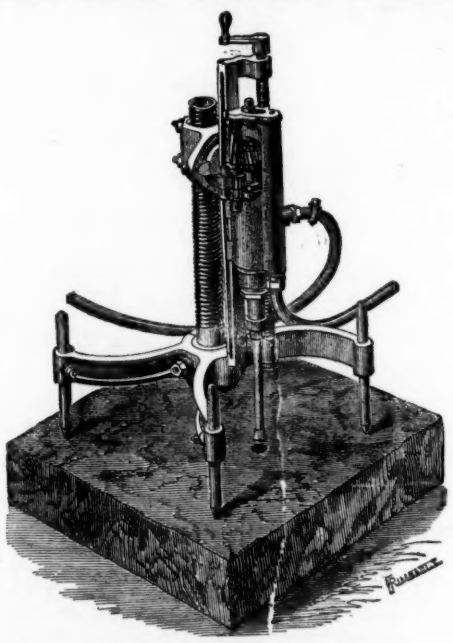

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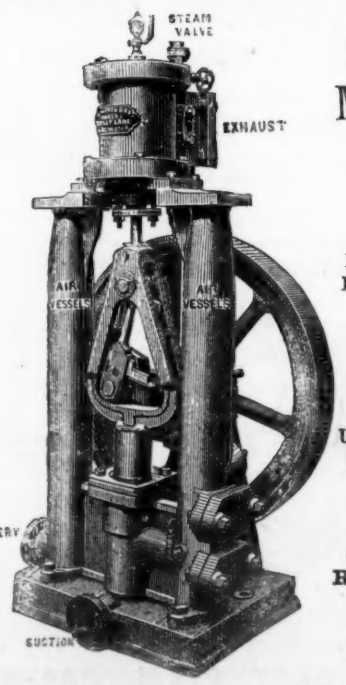

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"The simplest and best boring machine."—Capt. WASLEY'S letter to the *Mining Journal*, Oct. 18, 1873.

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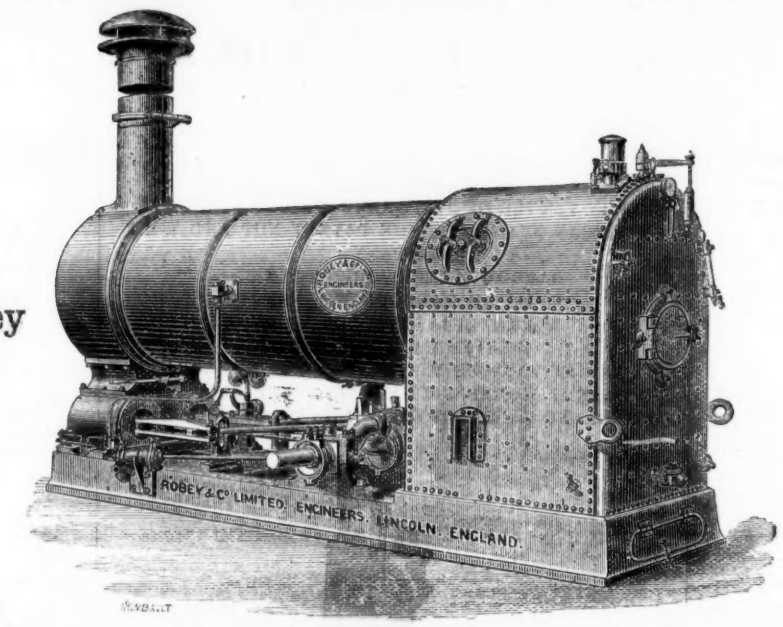

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PATENT RANGOON ENGINE OIL.

THIS OIL is suitable to every kind of Machinery; it is used almost exclusively in Her Majesty's Dockyards and Fleet, and by the War Office and East India Government; as well as by the Royal Mail Steam Packet Co., Pacific Steam Navigation Co., P. and O. Co., Cunard Co., and by most of the other important Royal Mail Steam Fleets in the kingdom. It is also extensively employed on the various railways, and by many of the leading engineering and manufacturing firms at home and abroad. "Chemical Laboratory, 7, Printing House-square, Blackfriars, April, 1869.

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Original Correspondence.

THE "NASCENT COPPER PROCESS."

SIR,—I notice in the Supplement to last week's Journal a letter attempting to throw cold water on Dr. Emmens' process, but it seems without knowing whether it answers any good object or not. The "annual report" referred to and the process are totally distinct things. The former only includes silver taken from crop ores, and to raise the lead to "72 per cent." much silver was washed away into the river as refuse, where the process is peculiarly adapted. We live in an age of science and progression, and thinking men whose eyes are open to improvements regard this process as a blessing to the mining community. "A. B. C." evidently thinks that the richest ores contain the most silver, and that because the average quantity in those ores is so low it is useless to look for an increase in poor ores. There never could be a greater mistake. Poor ores frequently contain the most silver, and it is to extract it and to raise the average still higher that this process is to be valued. How often is more silver found in the back of a lode or gossan than the rich ores contain underneath it? I have myself sampled (with other parcels of lead ore) a parcel of about 40 tons of doubtful stuff, which many persons saw, and when the assays came back from the assayer, who said it was worthless, I asked him to try it again, which he did, and with the same result, but when the tenders came in we had 17*l.* 2*s.* per ton offered for it, so that even the assayer, who was a very respectable man, failed to prove its worth, and, but for a more scientific process, this parcel of ore would have been thrown over the burrow—the parcel was antimony and silver, taken from a lead mine, but whatever affinity there be in lead lodes for silver, that does not lessen the silver existing in low-class copper ores, which can only be extracted by chemical operations, such as this is. It is used successfully in Cornwall, and if in Cornwall why not in a thousand other places? It may be tried, it is true, where there is not silver enough to pay, but that is no fault of the process.

That there are tens of thousands of tons of stuff thrown away over the burrows worth 2 per cent. for copper is a fact which no man who knows very much of mining will deny, and yet no blame to anybody, but here the process is valuable; and although I have not the pleasure of knowing Dr. Emmens, his discovery is a great boon to mining, and will soon be universally adopted.

There are men in the world who have no sympathy with advancement, and their motto ever is "As it was in the beginning, is now, and ever shall be, world without end;" and "A. B. C." wants us to believe that because 7 ozs. of silver only on the average is to be found in lead ore (per ton), there is not enough silver in copper to pay. If he will go back to the A, B, C of mining, and investigate this process for himself, he may stand a chance of getting his "few hundreds" back again, and discover the "nakedness" of his own assertions.

A PRACTICAL MINE AGENT OF 20 YEARS' STANDING.

Bodmin, Dec. 22.

"AIR AS FUEL."

SIR,—My attention has been called to a review in the Journal of Dec. 12 of the little volume I recently published, entitled "Air as Fuel; or Petroleum and other Mineral Oils utilised by Carburetting Air, and rendering it Inflammable." Will you permit me, whilst thanking your reviewer for his otherwise favourable notice, to correct an error into which he has fallen? He says of the author that "he states that all mineral oils are susceptible of being as completely converted into vapour as water itself; he admits that chemists have ascertained that this is not the fact, but he thinks his process removes the difficulty."

Now, what I did say had a very different meaning, and was as follows:—"Although it is generally believed by chemists that carbon (*i.e.*, charcoal or coke) has never been and cannot be separately vapourised, the process about to be described furnishes the nearest approach to it, for it consists in gradually converting the oil into a thin vapour of mixed carbon and hydrogen, and therewith impregnating atmospheric air, so that it shall enter the furnace already sufficiently combined with gaseous carbon and hydrogen to be immediately and by itself inflammable. May I also be allowed to add that the process in question has been already practically and successfully applied by me, not alone to some metallurgical purposes, and to the manufacture of illuminating gas, with which I have lighted several large buildings in England and abroad, but that in the course of my experiments I have also used it for the generation of steam, and have frequently worked a stationary engine with it.

In my book I have overstated the present cost of petroleum by including therewith the value of the casks in which it is shipped. According to the last advices the price of the crude oil at some of the wells in Pennsylvania had fallen to 1 cent, or ½d., per gallon, which is about 10*s.* per ton. Fresh discoveries of it, on a very large scale, have recently been made in Russia, and all the steamers on the Caspian Sea use petroleum as fuel.

The Author of "AIR AS FUEL," &c.

WHAT IS ELECTRICITY?

SIR,—Will you allow me to make a few remarks in answer to Mr. Edward Gledhill's letter in the Journal of Dec. 5? Mr. Gledhill states that Crickmer now admits that water consists of oxygen and hydrogen, but in a solid state. Of course Crickmer admits it. It is Crickmer's theory that ice or water consists of two solid materials. I gave the above solid materials the names of solid oxygen and solid hydrogen, in order to make a distinction between the solid materials and the gases. It matters not what name I gave them, they are solid materials all the same. You cannot find it mentioned in any chemical work that water consists of the above two solid materials chemically combined. The first time it was mentioned that water consisted of solid oxygen and solid hydrogen was by me, in the *Mining Journal*. I am glad to know that Mr. Gledhill admits that ice or water consists of two solid materials chemically combined, as that is all I have stated from the first up to the present time.

Let us have a fair understanding to begin with. In all the chemical works it is stated that water consists of a chemical combination of the two gases in the following proportions—two volumes of hydrogen gas chemically combined with one volume of oxygen gas. There is nothing said about solid oxygen and solid hydrogen. The discovery that water was a compound and not a simple body or an element, as it was supposed to be, was made in 1781, by Mr. Cavendish, who showed that two volumes of hydrogen gas unite with one volume of oxygen gas to form water. You see there is no difference between the theory of Mr. Cavendish, of 1781, and the theory in the best chemical works of the present time. Mr. Gledhill says I have gone a roundabout way to explain the composition of water; I am sure I have not. If it consists of a chemical combination of solid materials (which it does, and not gases), and Mr. Gledhill has admitted that in his letter, I think that anyone must admit it after reading my explanation of the matter. The next point I shall notice in Mr. Gledhill's letter is, are all the gases simple bodies or elements? I say they are not simple bodies or elements; they are all chemical combinations, and not elements.

With respect to Mr. Gledhill's bottles, I shall begin on his bottle of oxygen gas. I shall suppose it to hold 1 cubic foot of oxygen gas, and the gas to weigh 1 oz. I shall put a piece of red-hot iron into the bottle, the iron to weigh 7 ozs., it will quickly take all the solid material out of Mr. Gledhill's bottle of oxygen gas, and the piece of iron will then weigh 8 ozs., and the heat liberated, when the red-hot iron has decomposed the gas, will pass through the bottle into the surrounding atmosphere, and will become mechanically mixed with the same by radiation. The piece of iron has now gained 1 oz., and that ounce is a solid material chemically combined with some of the iron. Can Mr. Gledhill prove that the above solid material, now chemically combined with some of the iron, is the oxygen gas condensed into a solid, and that without the decomposition of the oxygen gas? and can Mr. Gledhill show how the oxygen gas was condensed and chemically combined with the iron without being decomposed, and without getting rid of the heat? I say he cannot. The weight of a gas is the weight of the solid material in such gas, and, more likely than not, the heat weighs something, but so little that the friction of our most delicate balances is too much for us to detect the weight of heat. In time to come we may have men able to calculate the amount and weight of the heat we receive from the sun in one year; also, how much the heat weighs to keep the Falls of Niagara in full work for one year. We know that heat produces the power to keep the Falls of Niagara in full work, and that heat comes from the sun. With all this power shown everywhere, and in so many different ways, yet men, and intelligent men on many other points, state that this all-powerful heat is *a nothing*. I cannot understand it. Is it prejudice, or is it a liking for old fixed theories and notions, or, what is it? I am sure I cannot understand. I believe if some people took as much trouble to try to find out all the particulars of heat as they take to try to prove others to be wrong and to stop others from progressing, it would be much better for the world, for the more any man can discover to advance science the better it must be for the world.

When Dr. Harvey brought out his theory of the circulation of the blood he had all the great doctors of the day against him, and it took many years before he could make people believe his theory to be the correct theory. Was it prejudice? Truth it was. When Davy brought out his theory of common salt, and stated that it consisted of chloride of sodium, a chemical combination of chlorine and the metal sodium, he had all the great French chemists, and nearly all the English chemists, against him, but ultimately it was proved that his theory was correct; and so I could go on with hundreds of cases of that description. Was it jealousy? Did they believe him to be correct, but would not acknowledge it? How often that is the case at the present time. There are a great many people who never try experiments or try to make discoveries themselves, and they are the first to oppose other people, and some of them show temper in the matter, and that not of the best sort.

Now, I must dispose of Mr. Gledhill's bottle of hydrogen gas. I shall suppose the bottle to hold 16 or 17 cubic feet of hydrogen gas, and I intend to cause the solid material in the above gas combine with a solid material to produce ice or water. In this case I shall only want one gas and one solid. Suppose I have a tube, and such tube to pass through a fire, and the tube to be red-hot, and in the tube I have a quantity of oxide of copper, and that is red-hot also. I now force 16 cubic feet of the hydrogen gas out of Mr. Gledhill's bottle through the tube, and over and amongst the red-hot oxide of copper. The 16 cubic feet of hydrogen gas will now contain 1 oz. of solid material in its composition, and in its passage through the red-hot oxide of copper the hydrogen gas will be decomposed, and the solid material in it will become chemically combined with the solid oxygen of the solid oxide of copper, and 9 ozs. of the solid material (ice) will be produced if required. The other end of the red-hot tube can be connected with a still-worm or coil of pipe, and from the end of the coil of pipe you will have run out 9 ozs. of water. Now, the oxide of copper (a solid) will have lost 8 ozs. of its weight—8 ozs. of solid oxygen (not a gas)—and now we have water produced from one gas and one solid. How can any sensible man reconcile the gas theory of water with the above experiment, for in this case or process we use one gas only?

Now that I have disposed of Mr. Gledhill's two bottles of gas, I should like him to show me how to fill them again—the small one with oxygen, and the large one with hydrogen gas—and that from the piece of ice I have produced, or from any other solid materials containing solid oxygen and solid hydrogen, and to do it without heat in some form or other, or without a chemical process to cause heat to combine with the solid materials, otherwise he cannot produce the above gases to re-fill his bottles from solid materials in the first instance. If he can do it without a chemical process (producing the gases from solids) I will admit that heat is no thing, that he is correct, and I am not, and that all the gases are elements or simple bodies, and that all the solids are elements or simple bodies also. Mr. Gledhill must prove it before I shall give in. I am not like most men. I have a great respect for heat, for I know it is a something, and a very powerful something too. I have stated that all the gases are compounds, and I am sure that I am correct. Suppose that Mr. Gledhill and myself agree to take carbonic acid gas in hand—Mr. Gledhill to take it as an element or simple body, as he admits it to be, and as it is stated in the accepted theory he speaks about, and Mr. Gledhill to do all he can, by argument and experiments, to prove carbonic acid gas to be an element or simple body, and for me to do all I can by experiments and argument to prove carbonic acid gas to be a compound, and both of us to send from time to time to the *Mining Journal* the results of our experiments, and for it to be done without ill feeling, and both to begin and remain civil and good-tempered to the last.

Mr. Gledhill wishes to know how I define a solid a gas, and my definition is as follows:—I consider a piece of coal, or ice, or oxide of manganese, or oxide of copper, to be solids and compounds; a diamond to be a solid and a simple body, but not a compound; hydrogen gas, oxygen gas, carbonic acid gas, and ozone to be substances and compounds, but not solids; electricity or free heat to be a substance and a simple body, but not a solid and not a compound. The above is my rude and rough definition of solids, gases, and electricity or free heat. When Mr. Gledhill and myself have finished our experiments on carbonic acid gas, if agreeable to him, we will go on with ozone, electricity, &c., Mr. Gledhill taking for his guide the accepted theories, and for me to prove (if I can) my theories by my experiments.—*Mawbey-road, Old Kent-road.* RICHARD JEX CRICKMER.

CAPE COPPER MINING COMPANY.

SIR,—It may be that I am under some misapprehension with regard to the present position of this company, hence I seek information. In the last annual report I find that the reserve ore then on hand was estimated at a produce of, I think, 33⅓ per cent. Watching the sales of ore since made (as published in the Journal) I find the produce has been considerably less than that estimated. At the last meeting an important discussion was initiated by Mr. Schofield as to the expediency of continuing to pay dividends of 1*l.* per share quarterly when, as he alleged, only 15*s.* per share was being really earned; and as now, as far at least as I am able to make out, the produce of the ore is lessening, if that gentleman, who had evidently worked out the subject, could be induced to give us further data he would be conferring a favour upon myself and, I doubt not, many other shareholders. That we should have guiding knowledge upon such vital points becomes just now the more needful by reason of the depressed condition and prospects of the copper market, and the comparatively unsatisfactory advices from the mines.

Dec. 22. A SHAREHOLDER.

MINING IN WALES—PARISH OF LLANARMON.

SIR,—I am happy to find that we have a prospect of seeing this once famous district in a flourishing state once more. I learn that extensive explorations are contemplated upon some of the best mines in the Principality, some of which will soon be in a state to yield returns upon but a small outlay, and it is a wonder to me that such mines as these have been allowed to remain idle for so long a period, especially so when we consider the high standard lead has and is holding, "but better late than never," and I for one am only too happy to congratulate the different capitalists who already have and those who do intend speculating in this parish. Being interested in mining, I would wish to give a full detail of the different mines now upon the move, as it were, in these parts, but at present this is more than I can do, and it would likewise occupy too much space of your valuable Journal, so I will content myself by giving a brief account of the following mines only.

OLD WESTMINSTER.—This mine has had many aliases, but it is none the worse for these, as ever and anon, when inspected and examined, it was always reported as a *bona fide* concern. It was inspected in 1867 by an eminent mining engineer, from whose report we ascertained that there was 600 fms. of ore ground that would then pay for taking away. But owing, I learn, to a certain gentleman having left the neighbourhood, this ground still remains untouched, together with many other good tribute pitches. In the year 1869, however, great hopes were entertained in this vicinity that the ground would again be worked, and, indeed, at the time there was every indication that such hopes would be realised, as the engine was put to work, and the water speedily being got out, it not being strong—a 9-inch pump being sufficient at all times to keep the mine dry; in summer frequently a small 26-in. cylinder was sufficient. But, contrary to all expectation, it seems orders came down to suspend operations at this point, and combine their strength further east.

PANTYGULANOD.—This mine was stopped in 1849, when lead was selling at 8*l.* per ton. The last return was 60 tons, enough at the present time to realise a profit. This amount can again be raised, once the water is pumped out, thus ensuring success to the fortunate proprietors. It was worked by a private company, and was stopped consequent to the low price of lead and blende, and the strong inducement held out at Westminster, which was being worked by the same company. But, under these circumstances, the men that worked in the mine proposed paying the company any reasonable price for the loan of the engines, and working the mine themselves, paying double royalty, and it seems the company contemplated at one time granting them this proposal. In the meantime the men had secured bail for any amount of coal that would be consumed upon the mine. They had also appointed their captain from one of the many upon the mine, and made all other arrangements necessary for the practical working of a large mine, when, to their chagrin, the engine was refused, being needed elsewhere. Had the men's proposition been carried out there is not the least doubt but that they would have been amply rewarded, and the company greatly benefited thereby. I learn that fine specimens of lead are being daily raised in virgin ground, within a few yards from surface, to the west of the old workings, and great hopes are entertained that this is the crop of the run now upon the Pantygulanod. I sincerely hope that this will prove a certainty.

NANT.—This mine was worked at the same time, and by the same company, as Pantygulanod; it lies to the north of this mine, in about 400 yards. The stratum and composition of the lodes are similar; the lode traversing this sett has yielded a profit of about 1,000,000*l.* sterling. The capital of this mine was expended, as we now too often find the case, in adorning the surface; and though the mine was monthly improving in its returns before the run of ore they were daily expecting to cut in driving west, the patience of the company became exhausted, and the mine was abandoned.

TANYGRAIG is another little mine in this parish, of which great hopes are entertained. It was mostly worked by the Romans, who, undoubtedly, raised hundreds of tons from it; the lode has been worked for from 100 to 200 fms. open cast. In depth the trials have been very limited. I have no doubt but that a small outlay would bring it into a profitable concern.

BELGRAVE.—This mine has been a renowned one, and there is every prospect that we shall see it so again under the able control of its appointed manager.

NANT-ADDA LEVEL is a level driven upon the course of the Nant lode east; this level would drain the Nant Mine to the depth of about 50 fms. I have examined fine specimens of lead from here. They anticipated in a short distance coming in contact with those runs that made the Nant so famous.

BRYNALLEN is, comparatively speaking, a new mine. There have been raised at different times several small deposits. They are at present driving upon a strong masterly lode, 6 ft. wide, bearing all the characteristics of the Pant and Pantygulanod lodes, which it runs parallel with, and it must be a phenomenon not yet met with in this district if this lode does not prove productive.

LLANARMON is what we cannot but term another young mine, in its infancy almost; though a great deal of money has been expended they are only now upon the crop of the ore-bearing measures. They have at present full dominion over the Flat, which proved so productive to the north of them, but, owing to their being afraid of cutting into water ere they had proved the Nant lode, which traverses this sett, these horizontal measures have been left—most likely until this object is attained.

PRIME MINISTER.—This mine is to the south of Llanarmon, and is being worked upon those horizontal measures passed through at that time; they have lately cut into some white lead, which is generally styled in these measures the harbinger of the blue. I hope this may prove the case here.

CRAIGIOG is the last mine I will mention; it has lately been worked by a private gentleman, and I learn they have some good lead in the breast of their level.

I think by naming these mines I have not trespassed upon any other parish than Lower and Upper Llanarmon; and while thus putting before the readers of the *Mining Journal* a brief history of them, I have not painted any of them, or given them a colour not their own. But while I now visited these parts I am surprised to find them idle, noticing the money our capitalists expend annually upon utterly worthless concerns; and in noticing these mines upon the eve of starting, I cannot help again congratulating the different fortunate proprietors.—*Dec.* 22. EXPLORO.

DISMISSAL OF MINE AGENTS.

SIR,—The supercession of the late managers and purser of South Condurrow Mine has excited a large share of disgust in this county, where they are known. The chief reason assigned for their removal is demonstrative of folly in those who used it—"dividends have ceased." So those agents are held responsible for the causes of the cessation of dividends. The causes were—1. Decline of tin (this was the main cause).—2. The increase in the price of materials.—3. In that of labour. What reasonable being on earth would think of alleging the fault of these changes to be that of the agents? They had not the control of the markets any more than the Bank of England, or the weather. I suppose that that reason was assigned as a mere pretext for deposing honourable and able men.

If the absence of dividends is to be generally used as a reason for the removal of agents, I speculate on a time when Captain Josiah Thomas will be removed from Dolcoath, West Frances, &c., and when Capt. Teague will be removed from Tincroft, Carn Brea, &c., for it is a very warrantable assumption that a time will come when such a state of things will supervene. The old adage "A good bal makes a good cap'n," is still, apparently, an article of faith in the creed of the South Condurrow committee, and of the chairman of the late meeting of the company.

Capt. Vivian and Sons have, doubtless, retired with the self-complacency arising from a consciousness of having acted honourably, and done their best to serve the company from the starting of the mine till their discharge, an act from which no disgrace accrues to them. If any agents can make the mine pay they could. Many testimonials have been presented to persons in Cornwall who deserve it much less than Capt. Vivian. S.

Dec. 23.

THE LAST RETROSPECTIVE VIEW OF MINING GENERALLY IN 1874.

SIR,—The lessons taught us during the past twelve months of the disasters that may be suffered through reckless speculation in foreign mines will, no doubt, prove a wholesome example for the future, not only to those who have embarked in them with such consequences as may, and can, be known only to themselves, but to all intended investors to look before they leap. I may safely say that not one out of every hundred shareholders that have contributed to the hundreds of thousands sterling to work these worthless bubbles have ever seen them, or ever will see them, and if the money had been thrown into the ocean the effect on the minds of speculators would have been far more beneficial than they were at present, when they hear of the last sparks or dying embers attached to their names, which must renew the sensation of their being duped by false representations.

So much for foreign mines, where we have pointed out the disadvantage of persons speculating in unseen so-called mines or mining properties, or, in other words, the buying of pigs in sacks—a mode of proceeding very strongly denounced in our earliest days, and one that we should do well to stick to as we advance to manhood and old age. In our home mining we have the remedy provided for, every mine in the kingdom being within 24 hours' ride by rail from the metropolis, so that gentlemen having embarked, or intending to embark, in mining may not only see the properties in which they have laid out their capital, but the actual work done for it, and form their calculations as to the requirements for new or future developments. To this cause I think in a great measure we have to thank ourselves for a great many mines not having collapsed during the present year in Cornwall. Take, for example, the noble instance set by the directors of the Crenver and Abraham Mines, which had it not been from the close attention and business habits of these gentlemen at the time I am writing this must have closed, probably for ever. As it is, however, I am one of those that thoroughly believe the capital raised at their last meeting will put them in a state of prosperity during the present century.

I remember well hearing my father speak with pride of these mines as being the deepest and richest left unwrought in the district, and if my surmises are right as to these becoming large dividend-paying mines it may lead to the opening out and working of most of the mines in this district, which have produced so many millions of pounds worth of copper and tin at shallow depths.

I have touched on these mines as an instance of what may be done by perseverance and determination. In my opinion, before another year is past we shall see in every well managed mine in Cornwall and Devon Blake's Stone Breakers erected, and I am quite certain their economy in many instances will be felt to such an extent as to enable many a great mine to make the accounts stand to the credit side of the ledger, instead of a state of indebtedness. This, and attention paid to the dressing of both tin and copper—which in my opinion should not be extended over a great extent of flooring, but should be kept in small compass, and the slimes well caught in pits, lined with planks, and cleanliness, which is indispensible to good dressing—will form the great improvement in 1875. That the Stone Breakers will answer Capt. Teague, who seems to lead the way in successful Cornish mining, has been already proved, and that the example will be followed is a certainty. When we reflect on the great disadvantages that the mines in Cornwall and Devon have passed through this year, the high prices of coals and materials generally, and the very low prices of copper and tin, I think all who may look into the future cannot but come to the conclusion that there is a much better, and I may say a much more satisfactory, future for them in store. I know of some young mines in a good district where the pluck of a gentleman, single-handed, is deserving of all praise; and if he should get his desert, it would not only serve him right, but would prove an inestimable blessing to the neighbourhood.

Before closing this I cannot bid adieu without a comment on some of the great mines in these counties, to what in some reports in the Journal would seem almost as a death knell to them. When we see the bottom of the bottom level being stoped away before the engine-shaft has reached a depth sufficient to open out a deeper level, I am induced to ask what is to pay under such circumstances?

Nothing! And unless mining is carried out fairly, like any other business with a lack of capital, it must fail and come to an end Let us hope, when we see so many good examples of proper mining set before us, that mining agents will not fail in doing their duty by pointing out to the shareholders what should be done to carry on their mines cheaply, and that the shareholders, seeing the necessity of doing so, will respond to their appeal; if so, we shall see many good men, similar to Capt. Teague, spring up in different mines throughout the two counties; and I have only to add that I sincerely trust it may be so.

I have already in a former communication touched on the mines of Cardiganshire and Montgomeryshire, since which there is but little change. There is, however, an improvement in the bottom of Bronfloyd, and the trials generally marked out by the late Captain Davis are likely to prove all that they were intended for, under the local management of his son. Before taking this last adieu of the year through your valuable columns, I may say that a general feeling is entertained throughout these counties that a more prosperous state in many of the mines is close at hand, and in which I thoroughly coincide. Flintshire, the mines in the North of England, and the Isle of Man, have not suffered so severely as the copper and tin mines, as lead ore has maintained a moderate price throughout, and with the present continued rise in prices we ought to be abundantly satisfied. And now, Mr. Editor, I wish you and your readers a merry Christmas time, and a happy and prosperous year in 1875.

Goginan, Aberystwith, Dec. 22. Absalom Francis.

LEGITIMATE MINING.

Sir,—It affords me much pleasure to see in the Journal of Dec. 5 the very practical letter from Mr. E. Betteley, also the letter of "An Intended Investor." It is more particularly interesting to myself as being expressive of views coinciding with my own, so far as extensive capital and mode of management are concerned, and have no doubt of a successful issue of so practical an application of capital as suggested. I presume that no inconsiderable amount of the capital required would be invested in the Tavistock district, on account of Mr. Betteley's long connection therewith, and I know of no district, either in Devon or Cornwall, presenting a greater field for mining operations with such prospects of success. From many years' experience practically, and considerable study of this district, I will give my reasons in this and in future communications for the above statement. The mining area of the district referred to is very extensive, and embraces wide fields for exploration upon lodes of copper, tin, lead, and manganese, and until about 10 years since it was the scene of great mining industry and of remarkable prosperity, and its decline may be attributed to the want of capital only, notwithstanding that it speaks well for it that mining has reared its head through the terrible crisis just passed, and that most of the mines in operation are in a very progressive condition.

The labour that has been spent in mines now abandoned is not lost, but will in the future be found of great advantage to those who will determine upon a greater development, aided by modern and more economical appliances. That minerals to the value of millions sterling have been returned is no evidence of exhaustion, but clearly shows the great productiveness of the ground, and I am of opinion that here the old adage may be applied—"That there are as good fish in the sea as ever came out." To qualify these remarks, I would state that the area of ground leased as setts in this district generally are of very great extent, and, as a rule, contain many lodes well defined, whilst operations have been confined to one or two only. There are many sections of this vast district worthy of having expended upon them separately the whole of the amount of capital asked by Mr. Betteley. For the present I would call attention to a section of about three miles square, extending from the River Tamar westward to the River Tavy on the east, and south from the celebrated Devon Great Consols Mine, upon which, although several mines are in operation, but very little, comparatively speaking, of an exploratory character is being done. The unwrought lodes of these mines, together with those improved in ground at present not under lease is upwards of 50 miles in length. This area is principally the property of his Grace the Duke of Bedford, and is geologically favourable for the production of copper generally. Whilst the natural advantages for mining purposes here are unsurpassed—elevated ground admitting of deep adits, ample water supply, and cheap transit—show the eligibility of this property.

There is scope here for mining on an extensive scale, with every indication of great and profitable results. "Time is money," and with the requisite funds mining can be carried on and properties developed much faster than has been usual, and results more speedily arrived at. Agent.

THE CAPEL CURIG QUARRY.

We have been requested to publish the following letter which has been addressed to the Editor of the *North Wales Chronicle*:—

Sir,—In your last issue there is a paragraph headed "Capel Curig," and the writer professes to know something about the slate quarry there known as Capel Curig Slate and Slab Company's, which article contains matter not true, and, therefore, requires an answer from me, as the person who opened the quarry. In the first place, I do not think he speaks truth when he says that almost every company entrusted its management to an Englishman; this is not so. I have never known a single instance of it, but I do not know why an Englishman should not be able to do it as well as a Welshman. He says never was a small quarry so badly mismanaged in the past as the Capel Curig; this statement is untrue, and I can prove it. I say that there never was a quarry opened to the same extent, and produced and sold so many slates as did the Capel Curig, with so small an outlay of capital; and further, I will say, and I can prove it, that not one tunnel was driven in the wrong direction. Not only so, but there were no tunnels at all when I sold the quarry to the present company. Two years ago, or previous to Mr. W. E. Parry going there, the quarry was not, as he says, about dead, or condemned as a local concern, but was working and producing slates to larger profit than it has ever done.

As to his inventions and planning powers, I leave that to quarry managers to prove, but I do not think there is anything new in principle to be seen at the quarry, therefore no invention. The quarry was first opened under the superintendence of that most practical and intelligent gentleman Mr. O. E. Hughes, of Trefriw (Crafnant), and worked under his direction till the present company bought it, and I believe there is not a slate quarry manager in North Wales who would say a word against him or his abilities. Again, I had Mr. Hugh McKie, C.E., of Portmadoc, to measure and value the works; he is well known as a gentleman of considerable experience in slate quarries; he said he had never seen a quarry so well planned before, nor opened to such an extent at so small a cost.

Before I sold the quarry to the Capel Curig Company I had made and sold 1600*l.* worth of slates, which I think shows that the quality of the rock was well proved before Mr. W. E. Parry ever saw the quarry. I had friends wishing to take up shares (lately), but owing to rumours of the bad management of the quarry, and to what an extent the rock was being spoiled, I employed a gentleman of very great experience and intelligence, Mr. R. R. Williams, of the Prince Llewelyn Quarry, Dolwyddelen, to go and see it, and report thereon. He has done so; the report I have by me. In conclusion, I will tell your correspondent of a copy I used to write when a boy, and advise him to learn it—"Self praise is no recommendation."

The Morfa, Conway, Dec. 16. Samuel Clift.

WEST GOGINAN LEAD MINE.

Sir,—I shall be glad if some reader can give me any information respecting the above mine. I am a shareholder in it, but can get very little news from the office, and as the reports are seldom sent to the Journal I fear from the little I can hear that the affair may be in a critical state. Before I take any more shares I should like much to know if it is true, as I have been informed, that at the present moment the mine is flooded, and that no underground work can, therefore, be carried on, there being no pumping machinery on the property, and no money in hand to provide it. If this is so, how is it the directors do not at once call a meeting, and tell us the exact state of things, and confer with us as to what is best to be done? Keep things dark is bad policy. I must confess that I expected a very different result from this mine, and I trust things are not so bad as they appear to be. In the meantime I shall be very glad to be put right about the matter. Perhaps the manager at the mine will volunteer some information.

Dec. 22. —— A Disappointed Shareholder.

EXCHEQUER GOLD AND SILVER MINING COMPANY.

Sir,—Can any of your correspondents give me information as to the present position of the above company. The reports in the Journal seem to be entirely discontinued. Some years ago the company was set on foot with very influential names as directors, and principally on account of the directorate I was induced to subscribe for my shares. Since then there has been only a succession of calls for more money, and the last apparently with the threat that the mine would be sold if the money was not produced. Now, giving all credit to the directors for an honest belief in the value of the mine, I think they are condemned by their own showing for commencing work with such inadequate capital. I do not know whether things are at the bad pass that I suppose, but the entire absence of information makes me and others very apprehensive. Agricola.

[For remainder of Original Correspondence, see to-day's Journal.]

FOREIGN MINING AND METALLURGY.

An adjudication for various descriptions of iron and materials has just taken place at Brussels. There was a fair competition, but there was at the same time no extraordinary margin between the tenders delivered. Upon the whole, the adjudication did not present any very marked characteristics, or exhibit any decided change or movement in the Belgian iron trade one way or the other. In a competition for locomotive axles, Messrs. Taylor Brothers and Co., of Leeds, tendered, but apparently without success, at 11*l.* per ton for one lot, at 11*l.* 0s. 10d. per ton for another lot, at 11*l.* 1s. 8d. per ton for another lot, at 11*l.* 2s. 6d. per ton for a fourth lot, and at 11*l.* 3s. 4d. per ton for a fifth lot. Messrs. Cooper and Co. tendered for the whole five lots at 11*l.* 5s. per ton. The general condition of the Belgian iron trade is unchanged. The Thy-le-Château Blast-Furnaces and Forges Company will pay, Jan. 2, statutory interest upon its shares for 1874. The net profit of the Ougrée Collieries and Blast-Furnaces Company for 1873-4 amounted to 10,227*l.*; this result admitted of the distribution of a dividend for the year at the rate of 16s. per share.

Business in copper has been inactive at Paris. Chilian in bars has made 91*l.*; ditto ordinary descriptions, 89*l.*; ditto in ingots, 97*l.*; English tough cake, 96*l.*; and pure Corocoro minerals, 90*l.* per ton. There has been scarcely anything to report with regard to copper at Havre. The Marseilles copper market has been well supported. There is little to report with respect to the German copper markets. There has been little doing in tin at Paris, and prices have remained without variation. Banca, delivered at Havre or Paris, has made 105*l.*; ditto Straits, 99*l.*; and ditto English, delivered at Havre or Rouen, 99*l.* per ton. The article has been tolerably well supported upon the Marseilles market. Tin has remained quiet upon the Dutch markets. Some sales of Banca have taken place at 57 fl.; this rate has, however, increased the demand on consumptive account, and holders refuse for the present to do business below 57½ fl. Transactions in Billiton have been very restricted. In Germany tin has not given rise to many transactions. Quotations for lead have not varied at Paris; French, Belgian, and German lead have brought 23*l.* 16s. per ton. Lead has remained quiet at Marseilles. There has been little business passing in lead in Germany, and prices have generally remained without change. There is little to report with respect to the Paris zinc market; Silesian, delivered at Havre, has made 25*l.*; other marks ditto, 24*l.* 16s.; and ditto at Paris, 25*l.* per ton. At Marseilles, Vieille Montagne zinc in sheets has realised 32*l.* per ton.

The intelligence available this week with respect to the Belgian coal trade is of very little interest or moment. The approach of the close of the year and stock-taking operations deprive the last few days of December of all interest. There is, nevertheless, a fair demand for coal for industrial purposes, as well as for domestic consumption, and deliveries contrive to be made with some regularity. A larger number of railway trucks are about to be placed at the disposal of Belgian colliery proprietors; this announcement has been received with much satisfaction. The North of Charleroi Collieries Company will pay, Jan. 2, an interim dividend for 1874 at the rate of 1*l.* per share. The Espérance Colliery Company will pay, Jan. 2, a dividend for 1873-4 at the rate of 16s. per share.

There was recently an impression that the French National Assembly would discuss in its present session the expediency of amending the law of April 21, 1810, with reference to mines; but the Minister of Public Works has announced that it has been deemed desirable to make further enquiries upon the subject before attempting any legislation with reference to it. When these enquiries are completed the Government proposes, however, to introduce a Bill upon the subject. It is then very certain that legislative modifications, however grave they may eventually be, will exert no influence upon the present season. It accordingly appears probable that, in the absence of any disturbing influences, the French coal trade will remain until the spring in nearly the same state as at present. For the time being only a comparatively limited business is passing in coal upon the French markets, as most persons are balancing their books for the year, and are not engaging in fresh transactions, or, at any rate, in more than they can help. Extraction operations are, nevertheless, almost everywhere resumed with some vigour. French commerce has generally experienced a little improvement of late, but the partial revival which has taken place is due more particularly to the abundance of the last harvest in France, and is associated principally with agriculture and the industries dependent upon it. Metallurgical industry has profited but very slightly from the improvement noticed in other directions, and so long as this important client of the coal trade does not materially revive coal quotations will probably remain heavy in France.

Official returns which have just appeared in illustration of the metallurgical production of France state several facts of interest. The production of plates in France in the first half of this year is returned at 56,100 tons; charcoal-made plates are shown by an analysis of this production to be every day becoming rarer and rarer in France. Thus the Ardennes which have long had a speciality for superior descriptions of plates produced in the first half of this year only 2000 tons of charcoal-made or mixed plates as compared with 6200 tons of plates made with coal. The department of the Nord is the largest maker of plates in France; its production in the first half of 1874 was 11,400 tons. As regards the production of steel the Loire district holds the first rank. This department alone produced in the first half of this year 43,300 tons, or nearly half the total production of France, which amounted for the six months ending June 30 to about 100,000 tons. In this total of 100,000 tons it should be added that steel made, according to the Bessemer and Martin processes, figured for 95,000 tons. As regards pig, the department of the Meurthe-et-Moselle is the largest producer, having made in the six months ending June 30 some 117,200 tons; the Saône-et-Loire ranked next with 87,400 tons. The quantity of pig made in all France in the first half of this year was 700,000 tons in round figures; in this total coke-made pig figured for 600,000 tons. The quantity of charcoal made pig produced in France in the first half of this year was 72,500 tons; in this total the Haute-Marne figured for 10,800 tons. As regards the current position of the French iron trade, it may be remarked that the tone of business is extremely quiet. Pig is, nevertheless, held with firmness, and makers are not without some hopes of a revival in affairs. The Vienne Metallurgical Company is paying an interim dividend of 4*l.* per share.

From the Malay Peninsula we learn that the State of Perak is just now most interesting. In that part of Perak known as Laroot the industrious Chinese are busily working the tin mines, and now that they have been unmolested for some months they are working them with such good effect that it is estimated that the revenue derived from this district alone will reach $100,000 a year; and Capt. Speedy, the acting resident, is actively opening up roads, forming reservoirs of water for the mines, and carrying out other works of public utility.

A sensible proposal has just been adopted by the National Association of Miners. They have resolved to send a deputation to Belgium to enquire into the grounds of the present successful competition of Belgian iron with English in this country, and its probable duration. They are to report upon the nature of the stone, coal, and other mineral products required in the production of finished iron, and the cost of manufacture and transport hither. Of course, everything depends upon the intelligence, completeness, and fairness with which the work is done; but it is at least a step in advance when, instead of bluntly denying the possibility of successful foreign competition, workmen begin to enquire into its real nature and prospects of continuance. Truth in this matter will best serve the interests of everyone in the long run.

According to the report of the Creuzot Works, in France, read at the general meeting of shareholders at the end of last month, the production of steel by that establishment during the past year amounted to 128,000 tons. The total value of the production was 55,000,000 fr. (2,200,000*l.*), of which 20,000,000 fr. (800,000*l.*) represented exports. The profit and loss account showed a gain of 6,600,000 fr. (264,000*l.*) of which 1,3000,000 fr. (52,000), was written off to the reserve fund, a dividend of 70 fr. per share being declared.

AUSTRALIAN MINES.

Port Phillip and Colonial Gold.—Nov. 2: Quantity of quartz crushed for the four weeks ending Oct. 7, 3648 tons; pyrites treated, 22 tons: total gold obtained, 721 ozs. 1 dwt., or an average per ton of 3 dwts. 23 grs.. Receipts, 2946*l.*; payments, 2592*l.*: profit, 354*l.*, which, added to last month's balance of 896*l.*, made an available balance of 1250*l.*, which was carried forward to next month's account.

Yorke Peninsula.—The directors have received advices from the Committee of Inspection at Adelaide, dated Nov. 4, with reports from the Kurilla Mine to the same date. The committee acknowledge the due receipt of the board's telegram of Oct. 16 last, instructing them to resume operations actively. Accordingly the engine was started, and it was expected that the mine would be cleared of water to the 25 by Nov. 10. A new shaft was to be at once completed west of Deeble's, to get below and raise the ore laid bare in the 25, west of Deeble's. A small shaft was to sunk east of Hall's for the purpose of ventilation, in order to more effectually enable Capt. Anthony to set tributers at work. He intended to sink to the 25 at the new discoveries, and to cross-cut and prove the whole of the lodes and intervening ground at that level in that part of the mine. The engine on the company's adjoining Duryea property was about to be removed to the new shaft, and until that could be made a drawing-shaft the engine at Hall's shaft would be used for work at and west of Deeble's, as well as in its own locality. Capt. Anthony proposed to employ at once 36 miners, and he concludes his report by stating—"All well. I shall be able to present a fuller and more interesting report for the next outward mail after a full month's operations."

English and Australian Copper Company.—Nov. 7: All the furnaces at Port Adelaide and at Newcastle were in full work. Since date of last advices about 232 tons of copper had been shipped.

Anglo-Australian (Gold).—Capt. Raisbeck reports (Fryerstown, Nov. 3)—I have the honour to report progress since the 6th ult.—Prospecting Shaft: We have extended north drive 53 ft.; total distance from shaft, 390 ft. This is now parallel with the east shaft, and is stopped. It is independent of any quartz we may have passed through to the east or west, worth 150*l.* for the future working of the mine. We have crushed for the month 25 tons of stone; result, 5 ozs. 7 dwts. retorted gold. We have also crushed for the public 20 tons of quartz. As we did not succeed in purchasing a suitable winding-engine, we have contracted with Mr. Vivian, ironfounder, to make and erect a suitable winding-gear for 38*l.* 2s. 9d. in connection with the present engine, but we shall not be able to crush and wind at the same time; I am, however, confident it will answer our purpose until our prospects have materially improved. I shall be able to haul 5 tons per hour from the 400 ft., which is more than we can break with the men we shall be able to employ. We can then crush 18 hours per day if required. We have advertised for tenders for driving a cross-cut 160 ft. east, in the east shaft, at the 200 ft. level, which has been taken at 15s. per foot, 25 per cent. to be retained by the company until the completion of the contract. The cross-cut will then be directly under the north drive from prospecting shaft. I have centred the shaft from the 200 ft. level to the the surface, and am now preparing the shaft below that level. I expect to be ready for winding in three weeks if we can purchase good second-hand trucks and cages.

Australian Central (Gold).—Mr. Gill (Fryerstown, Nov. 4), writes:—I trust the receipt of my letter of details, due in London Sept. 28, in reference to my telegram of the Aug. 12, will afford some encouragement to the shareholders to take up the unissued shares in sufficient quantity to enable me to resume work, though I fear that so many previous applications for additional capital may have exhausted both their patience and their confidence in the value of the property. The present demand, however, is made under very different conditions—to enable me to do a certain amount of dead work, which should have been carried out two or three years since, and which it was my intention of doing at the period of my taking charge. By this time had I not met with unforeseen difficulties you are already acquainted with, and which not only absorbed all my available means, but necessitated the incurring of heavy liabilities, I should have had a north level in at least 600 or 800 feet, and the present deep ground would have been in full work and returning handsome profits. The Lord Malmsbury Company, adjoining, are now in with a main level about 1000 feet north, their ground, though not the same gutter apparently as the Central, also improves north, so much so that additional machinery is being erected. I believe when the present deep ground north is fairly opened up it will be found to be richer than any other mine in the district. The thickness of the wash-dirt at the southern boundary of the mine did not exceed 1 foot, while in many places where the bodies of sand touched the bed-rock none at all. Going north the wash gradually thickens, and at the deepest part touched the wash is about 4 ft., with good gold all through it. Another peculiar feature is that the sand appears to be dying out, and a heavy clayey wash takes its place, such description of wash being always heavily charged with gold when found in this ground. Under such conditions, and with such prospects in view, it would be simply throwing away an absolute certainty should the shareholders decline subscribing fresh capital.

Burra Burra Mines.—The directors of the South Australian Mining Association have issued their report for the half-year ending Sept. 30. From it we learn that the yield of ore of the Burra Burra Mines for the six months was 1529 tons 2 cwts. 3 qrs., as against 1514 tons 4 cwts. 2 qrs. for the preceding half-year. Although this is comparatively satisfactory, it still brings out a very poor result. In the March half-year the value of the ore raised did not reach the cost of producing it by 6081*l.*, and after allowing for receipts of rents and fees, a loss was shown of 4103*l.* The larger output and the rigid economy exercised in carrying on the workings have somewhat improved matters for the last six months, but there is still an estimated loss for that period of 2162*l.* The credit to profit and loss account has consequently been still further reduced from 12,030*l.* to 9868*l.* From March 31 to Sept. 30 the sum of 24,349*l.* was spent in wages and the purchase of plant, stores, &c., and an amount of 1530 tons of ore was sold to the English and Australian Copper Company. The liabilities of the association are set down at 77,654*l.* to meet which there are assets as follows:—Property, consisting of mine, land, and buildings, 62,891*l.*; plant, stores, &c., 6250*l.*; ore on hand, 499 tons, estimated to be worth 4925*l.* 8s.; debts and bills receivable and cash in hand, 3587*l.* 11s. The report of Capt. Saunders describes the work that has been carried on in the mines during the six months, and indicates that a considerable saving has been effected in the management in various directions. The number of hands has been reduced by 88, economical machinery has been erected, and arrangements made by which the expense of haulage is lessened. The company's establishment at the mines on 30th ult. consisted of 233 men and boys, and five officers. In conclusion, the directors state that although they have reduced the expenditure to the lowest possible point, there is better prospect of obtaining profit in the future without the assistance of a much larger capital to prosecute deep workings than they can expect to command. They have, therefore, communicated with the London board of advice to ascertain their view as to the propriety of either letting the property or submitting it for sale, and winding-up the association. An answer is expected by the next or following mail, when an extraordinary meeting of the shareholders will be called to take such steps as the nature of the reply may render necessary. It cannot fail to excite general regret that the once-flourishing Burra Burra should have sunk into so unsatisfactory a position.—*South Australian Register*, Nov. 7.

Manufacture of White Lead.—Some improvements in the manufacture of white lead and in apparatus connected therewith, part of the arrangements being applicable to the production of lime, have been invented by Mr. A. P. Meylert, of New Britain, Connecticut, U.S. The invention relates to —1. The combination of one or more kilns for the burning of limestone in the manufacture of merchantable lime with one or more corroding rooms for the manufacture of commercial white lead.—2. The construction of a corroding room so that the same may be closed at the top and sides. A pipe or chamber conducts atmospheric air to the room, which is made to discharge at or near the top of the said room, the air being forced into the room by artificial pressure or otherwise. A pipe or chamber conveys steam or vapour into the room, its point of discharge being at or near the top of said corroding room. A layer of wet tan bark near the bottom of the room is heated by a pipe conveying steam to an open space underneath the same. A pipe or chamber conducts steam from the open space below the tan bark, to a point within the corroding room at or near the top of the same. A jet or spray of water is employed for moistening the atmospheric air, and for moistening the dry steam before they enter the corroding room.—3. The combination of a casting machine or apparatus for casting lead with a corroding room or rooms by means of suitable conveyor bells, which receive the lead from the casting moulds, and convey the same into the corroding room.—4. The combination of a stand-pipe containing coke or other suitable material with an induction and eduction pipe conveying carbonic acid gas into and from said stand-pipe, and also with a pipe conveying acetic acid within said stand-pipe.—5. The combination of a stand-pipe with an induction and an eduction pipe conveying carbonic acid gas into and from said stand-pipe, and also with pipes conveying suitable purifying materials into and from said stand-pipe.

Copper Pyrites.—Mr. F. La Rue, of Quebec, has patented a process for eliminating impurities from and preparing copper pyrites for convenient transportation, by partially reducing the previously roasted and carbonised ore with heat until it becomes magnetic, and then passing the product through an electro-magnetic machine, whereby the copper and iron ores are separated from the earthy or other matter.

Metallic Composition.—Dr. Kunzel, of Blasewitz, has patented an invention, which consists in the manufacture of metallic compositions having phosphorus combined therewith, such metals being employed as possess different degrees of fusibility, so that the mixture after being heated forms in the process of cooling a porus or cellular mass, the pores, or cells, or interstices of which are filled with the more fusible and softer metal (which has become more or less mixed or alloyed with one or more of the harder and less fusible metals), surrounded by the harder or less fusible metal, the latter forming the walls of the cells. The softer or more fusible portion of the mass constitutes the rubbing face which is exposed to friction. The following are the approximate proportions of the compositions:—(*a*) One-half to 3 per cent. of phosphorus, 4 to 15 per cent. of lead, 4 to 15 per cent. of tin; the necessary proportions of copper being in each case added to make up 100 parts. When more than ordinary hardness is desirable in the formation of the cells the following approximate proportions are used:—(*b*) ¼ to 2 per cent. of phosphorus, 4 to 15 per cent. of lead, 4 to 15 per cent. of tin, 8 to 15 per cent. of zinc; the necessary proportions of copper being added in each case so as to make up the 100 parts.

OFFICIAL REPORTS ON EXPLOSIVE SUBSTANCES.—No. II.

It is no part of our present purpose to trace out the history and causes, however curious and instructive, of these contrasts and gross anomalies. Suffice it to say that they exist, intensified by the legislation under panic of 1860, founded, to say the least of it, on misapprehension and misrepresentation. But, though officially this has come to be recognised the legislation remains unamended, and the indirect effects, in the refusal of railway companies to transport certain explosives, remain and prevent even partial relief. The result is that either by the Acts of the Legislature or the refusal of the carrying monopoly, the choice of a suitable explosive agent for blasting purposes in the industrial pursuits of mining and quarrying is practically limited to gunpowder

But it is abundantly clear, from a perusal of these Official Reports, that gunpowder is really more dangerous to manufacture, store, transport, and use, than the other modern explosive agents, such as dynamite; and it is somewhat more than probable that if the cargo of the Tilbury had comprised dynamite in lieu of gunpowder no explosion would have occurred. Major Majendie is particularly emphatic in treating of the dangers to the public from gunpowder transit by land; apart from the question of the conveyance of large quantities of powder about the country in all sorts of ways, he comments on the absence of all regulation (as none of the provisions of the Act apply) in the case of quantities not exceeding 100 lbs., as also on the absence of proper precautions. Gunpowder may be conveyed in the same carts as ordinary goods, such, for instance, as matches, petroleum, &c., and there is no penalty whatever attached to the commission of any dangerous act or practice near powder-carts in transport. Powder is thus frequently conveyed through the most populous districts, not merely in single carts or wagons, but in consignments of several tons at a time. Now, such conveyances, of whatever kind, are for the time being travelling magazines, and should, therefore, be subjected, *mutatis mutandis*, to the same or similar precautions and restrictions as are enforced in the case of stationary magazines. The excessively high rates and infrequent facilities for the conveyance of powder afforded by railways tend to encourage concealed conveyance of powder, fireworks, and explosives, by consignments under a false name, an objectionable and dangerous practice which prevails largely, and to which no penalty attaches, except in the case of dynamite, &c. Very many of the same observations apply to the water-transport as to the land-transport of gunpowder, &c., the provisions of the Acts being quite inadequate, and there being really no sufficient restriction or supervision; and considering that vessels so loaded often move about through the most populous neighbourhoods, it is very important they should be under proper supervision and regulations. For example, gunpowder may be stowed away in the same compartments as a miscellaneous cargo, and exposed thereby to all sorts of risks of accident.

The "blue bursticle" testified to by the boatman, and the scientific evidence at the inquiry into the late catastrophe, showing that the cause of the explosion was due to the presence of the inflammable benzoline in the cargo of the Tilbury, no less than the loss of life and injury to property, now the subject of inquiry and assessment, all these bear silent but eloquent testimony to Major Majendie's prescience. And it is indisputable that the same hazards have been run, before and since, daily and hourly.

Considering the large quantities of powder daily loaded and unloaded at stations in the heart of towns (and notably at the large London termini), the extensive shipment and unshipment of powder at public wharves in populous neighbourhoods, along most of our navigable rivers, and at the various canal and carrier depôts throughout the country—powder in the process of handling being infinitely more liable to accidental ignition than when undisturbed in the magazines—Major Majendie specifies four restrictions—1. That gunpowder should not be shipped or unshipped, loaded or unloaded at all in populous neighbourhoods, or within a certain distance of houses (as at Liverpool).—2. That all persons charged with the duty should be thoroughly acquainted with this class of work.—3. That no such loading or unloading should be carried on except in certain hours in the daytime.—4. That it should be carried on under very stringent regulations. But he concludes that the fourth regulation alone is practicable, as they could not be universally applied without seriously hampering the trade in the carrying of powder, and the result of such measures would infallibly be an increase in the quantity of powder surreptitiously conveyed, and, therefore, actually an augmentation of public danger.

Not to say that this appears a lame and impotent conclusion, it is at least open to comment, as being antagonistic to, and inconsistent with, the general tenour of Major Majendie's opinions and suggestions; moreover, instancing defects and anomalies of the existing laws, Major Majendie states, and justly, that the law relating to nitroglycerine and nitroglycerine explosive compounds or preparations, is altogether out of harmony with the legislation relating to other explosives, and is as much too stringent as that relating to gunpowder is too lax; and the effect of the marked distinction between the cases of gunpowder and nitroglycerine preparations, dynamite, &c., is extremely prejudicial to the interests and development of the nitroglycerine industry, and gives rise to the impression that an explosive which requires to be so exceptionally treated must be exceptionally and alarmingly dangerous, which it is not. Wherefore, it appears that to restrict and hamper an industry, or a trade, is not always a matter for tender consideration.

Now, in his report Major Majendie very properly condemns the Nitroglycerine Act of 1860, as a measure which is very open to criticism, and as containing penal clauses which, however necessary they may have been at the time of its passing, when the safer applications of nitroglycerine (such as well-made dynamite) were comparatively unknown, appear with our present knowledge to be unnecessarily stringent. Again, although it was, doubtless, right and proper to forbid the carrying of nitroglycerine without a license, or the carrying, under any circumstances, of a description of nitroglycerine preparation, the safety or stability whereof there are good grounds to suspect; yet it is hardly reasonable to forbid a person to carry any safe, duly recognised, nitroglycerine preparation (such as dynamite) in however small a quantity, without a license; an unreasonable prohibition, which has resulted in the refusal of the railways, with one or two exceptions, to carry dynamite at all. The time has, however, come when all the experience has been had necessary to warrant the assertion that safe and approved descriptions of nitroglycerine preparations should be placed at least upon the same footing as gunpowder and other explosives.

Supplementary to the foregoing, it may be noted that the Special Committee (War Office) on Guncotton and other explosives have placed upon record their conclusions—that a safe and unobjectionable nitroglycerine compound, possessing valuable explosive properties for many useful purposes, and fully meeting all the requirements of quarry owners, can be manufactured, transported, and stored in this country; also, subsequently, that, under ordinary conditions of temperature, boxes containing dynamite might safely be subjected to severe concussion, and that the material is not liable to accidental explosion by rough handling, or by any violence to which it might be subjected in ordinary transport; that the accidental ignition of a small quantity of dynamite (such, for example, as a box containing 50 lbs.) would not be followed by an explosion, and that No. 1 Dynamite, as manufactured by the British Dynamite Company, is a valuable explosive agent, and may be manufactured, stored, and transported, subject to the existing regulations laid down for other nitroglycerine compounds, provided the percentage of pure nitroglycerine does not exceed 75, and that of absorbent earth does not fall short of 25.

In regard to the transport of dynamite, Major Majendie amplifies his statements in a memorandum with reference to its conveyance by rail, instituting a comparison between it and gunpowder. With regard to the liability to accident from external causes, dynamite of the specified composition and quality is somewhat less dangerous than gunpowder in barrels. As to the liability to accident from internal causes, the risk would be somewhat less in regard to fire-giving or explosion-producing agents, to spontaneous ignition or explosion due to the presence of foreign substances, and to accidents from sparks; probably less, also, with regard to accident from friction or percussion; probably not greater with regard to risk from the chemical instability of the explosive itself; and, somewhat, though scarcely in any practical degree, greater with regard to accident from elevation of temperature; whence it results that it may be taken broadly that dynamite of the specified composition and quality is, on the whole, safer to transport than gunpowder packed in barrels.

Additional testimony on this point is supplied by a decree of the Austrian Royal Imperial Ministry of Commerce, addressed to the collective Railway Directorates, to the effect that, as the new experiments as to the liability of the material dynamite to explosion have greatly weakened the fears previously entertained by the Ministry of Commerce, which had induced its exclusion from transport as an easily explosive substance, and have demonstrated rather that the transport of dynamite is much less dangerous than that of any other explosive material now in use, the Ministry of Commerce is, therefore, induced to allow the conveyance of the explosive material known as dynamite by railway under certain regulations and precautionary measures, and declares null the decree against its transport.

In Major Majendie's explanations to the Select Committee he explains that by preparations of nitroglycerine he means dynamite and substances of that class, which have been passed and allowed as safe. Of such there are but five licensed. Trade in nitro-glycerine is undesirable, because it can be so much more safely employed as dynamite. Dealers in dynamite and nitro-glycerine derive certain advantages from the system of licences, but these are more than counterbalanced by the invidious and marked distinction drawn by the Legislature between those explosives and gunpowder. The main merit of dynamite consists in the fact that it absorbs the liquid nitroglycerine, and transforms it, so to say, into a solid substance. As regards the control and inspection of these substances, he is anxious that railways should be required to carry them under certain regulations, as the time has come when these explosives may fairly be relieved from such unnecessary restrictions as are now imposed on them by the Nitroglycerine Act. Dynamite, for example, when carefully made as now, so as to eliminate entirely the risks of exudation and chemical decomposition, is assuredly free from certain risks to which gunpowder is liable.

Two kinds of dynamite have been licensed, No. 1 consisting of 75 per cent. of nitroglycerine, absorbed in a certain infusorial earth called kieselguhr, and having no nitrate or any other substance at all; and No. 2 containing a less proportion of nitroglycerine, with a certain quantity of substances which may be deemed a form of gunpowder—nitrate of potash and carbon; one appears to be as safe as the other, but the latter is meant to be the least powerful. In both the nitroglycerine is absorbed, but it is in mechanical combination only with the kieselguhr. Stability of composition, and the avoidance of exudation, may be secured by careful manufacture. This material is liable to freeze, and is more inert when so, but the process of thawing, with a little care, may be effected without danger by means of warm water, or by placing it in a manure heap, or in the pocket. Dynamite is becoming largely introduced in some districts; it is very valuable in very hard metalliferous mines, and is used in wet ground with very great effect.

Colonel C. W. Younghusband, R.A., Superintendent of the Government Gunpowder Factories, states that, in placing all nitroglycerine compounds in the same category with liquid nitroglycerine the existing Act is needlessly harsh, stringent, and oppressive to the trade and mining interests. One very material point, as showing in this respect the greater safety of nitroglycerine compounds over gunpowder, is that if ignited by a spark or by flame, which would certainly explode gunpowder, dynamite in most cases would probably burn away without explosion. If pure it is comparatively safe, and may be thawed without danger, if done with ordinary care.

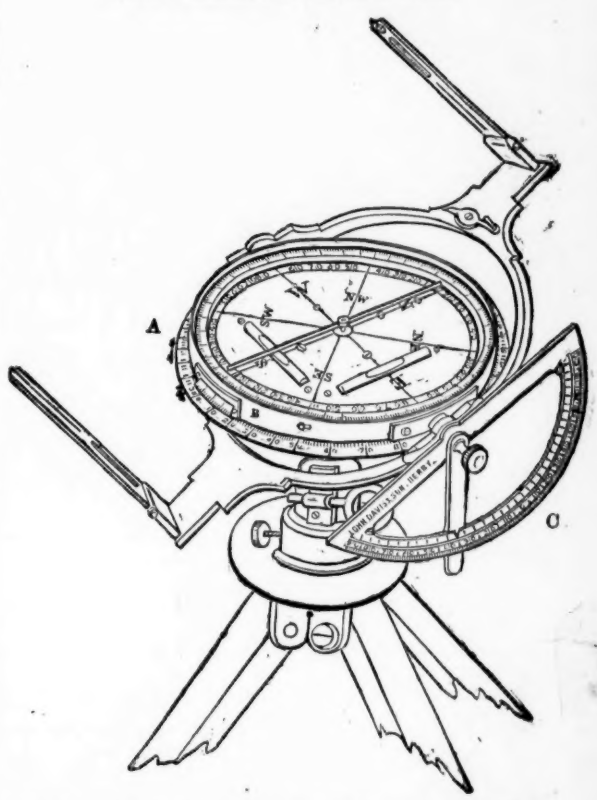
Prof. Abel, Chemist to the War Department, institutes an instructive comparison between gunpowder and dynamite No. 1. In respect of the manufacture, gunpowder is dangerous from the very first moment when the manufacture has commenced; it is explosive from the very period when the mixing of the ingredients has begun. In the case of dynamite, the manufacture of the nitroglycerine is a dangerous operation, but when once prepared and purified the further operations attending the production of dynamite are safer than those attending the concluding operations in the case of gunpowder; the mixing of the liquid, which bears moderately rough handling with safety, with an inert solid substance, and the gradual compression of the mixture into cartridges, by very simple mechanical means, are really safe operations in themselves. In regard to transport, dynamite in small quantities would be decidedly safer to transport than gunpowder; the non-liability to exudation or escape from its packages (a condition distinguished from the earlier forms of dynamite known a few years ago), as also its plastic condition, constitute elements of safety. As regards the possibility of accident by fire or carelessness in storage, a small quantity—say, 1 to 3 cwts. of dynamite (equivalent to from 5 to 15 cwts. of gunpowder) would be safer than a small store of gunpowder, because dynamite, being plastic and supplied in cartridges, is not readily spilt or dusted about a room; it is less readily ignited by sparks, and if ignited in small quantities it burns gradually, and does not develope explosions. For the same reasons dynamite is safer than gunpowder in its use in ordinary mining operations, and will stand safely a very considerable amount of rough usage. Pure dynamite No. 1 is generally as safe a substance as gunpowder, as made under patent by a company near Glasgow; the directions being strictly carried out there is no liability to exudation. Dynamite is in a very large number of respects less dangerous than gunpowder, but limited by the questions of quality and quantity. Preparations of nitroglycerine and guncotton when stored in very large quantities are more dangerous than gunpowder.

Major F. E. B. Beaumont, M.P., appearing as a witness from a consumer's point of view entirely, attended with a view of pointing out and emphasising, on behalf of the consumers generally, the grounds on which the present restrictions on the use of nitro-glycerine should be taken off, dynamite being safer in use than gunpowder. The railway companies, however, cannot be got to carry it; nevertheless, both for transport and for use, dynamite is far safer than gunpowder, and for the reason that in the works under his charge he has had several accidents through gunpowder, but never a single accident with dynamite. The men, as soon as they have had experience with dynamite, always attach very much importance and value to its use, and as a matter of fact, have far greater confidence in it than they ever had in powder. In works such as mining and construction of tunnels—in fact, all works where hard rocks have to be dealt with—the importance to the commerce of this country in introducing an explosive such as dynamite is so great that it is hardly possible to estimate its value. If the railways could be got to carry dynamite at the same rate as gunpowder it would be an enormous advantage; and if the public and the world at large could be persuaded that they might really use it with greater safety than gunpowder, and that it might be stored more safely as well (though that is not so clear as the question of use), dynamite would be made at a less rate, and it would put blasting-powder out of use in all the industries of the country where an explosive is required, while a very considerable advantage would result to all those great industries that are using explosive compounds. In use, one of the great points of dynamite is that it is in a moist condition, and when stemmed with a wooden stemmer it lends itself to the shape of the hole; and this is a great advantage over guncotton, with which accidents in ramming are as they may be called, explosives proper. Premising that to speak of safety in connection with any substance having explosive qualities is an anomaly, and to apply a misnomer; nevertheless, this is after all a question of degree. Broadly speaking, dynamite is an explosive of maximum power with minimum risk; it will, as a rule, explode only by the agency of a detonating fuse; ordinary rough handling, concussion, fuses, flames, or sparks, being ineffective to explode it. When exploded by detonation, however, it produces the most powerful effects, being at least five times as powerful as ordinary blasting gunpowder. But, like all explosive compounds, it must be made, handled, and used with ordinary care, and so treated, it is safe to make, store, transport, and use.

Such are some of the lessons derived from an attentive perusal of the Parliamentary Blue Books referred to. They show conclusively that at least one valuable explosive—dynamite—has been subjected to disabilities, and put out of court, by legislation under the influence of panic and misconception (in the Nitroglycerine Act, 1869), but that, nevertheless, it has won its way to the front, and obtained full recognition of its merits by the official mind, as well as by practical men, as an industrial explosive agent of great value and power, and comparative safety. It is, therefore, abundantly clear—in the words of Major Majendie, adopted by the Select Committee—"that the time has come when it will be proper to place safe, and approved nitroglycerine preparations broadly upon a similar footing to gunpowder and other explosives, as near as may be. This cannot, however, be done without repealing the existing Nitroglycerine Act. But to repeal the Act without providing a substitute would fail to accomplish the object, and would leave explosives of this class practically unregulated—an arrangement that would be most dangerous and improper. Therefore the occasion seems suitable for incorporating in one measure homogeneous provisions for the regulation of all explosives, so as at once to correct the defects of the existing Gunpowder Acts, already set forth in this and preceding reports, and to bring the law relating to nitroglycerine preparations more into harmony with the general legislation relating to explosive substances."

So we may best avoid a repetition of the Regent's Canal catastrophe, and as far as possible eliminate the tremendous risks to which the public have, all unwittingly, been exposed. It is impossible to doubt that the forthcoming session will see legislative action taken in the matter, whereby equal justice will be meted out to dynamite, and to the old offender—gunpowder.

DAVIS'S IMPROVED HEDLEY DIAL.



The dial, as above shown, has been lately invented by Messr John Davis and Son, of Derby, and contains many advantages ove the well-known Hedley dial. The vernier in the ordinary Hedley dial cannot be used in conjunction with the needle without first clamping the body of the dial, which causes a loss of time, and also there is great wear and tear in clamping and unclamping, and this is very apt to put the dial out of adjustment.

The improvement in this dial consists of an additional plate under the dial body, shown in the engraving at A, which projects beyond the dial body, and is figured and divided into 360°. This plate is clamped to the ball-and-socket joint, and remains rigid. The Hedley swing sights move on axes fixed to body of dial, and to the outside ring of dial body is fixed a vernier, shown at B in engraving, and this vernier reads upon the plate A to 3 minutes. It will now be easily seen that in taking a sight the angle can either be read from the vernier or the needle. The figuring of the needle ring is reversed—that is, the east and west exchange places—therefore the angles are read off correctly, and the figuring of the outside row of figures (that is, the vernier ring) is so arranged that the readings of the needle and the vernier tally. For instance, if the needle reads 30° W., the vernier also shows 30° W., thus they keep one another in check, and will detect any error, whether caused by incorrect reading or from any local attraction, and that which has been hitherto doubtful in mining surveying will, with this instrument, be certainty of accuracy as far as the magnetic bearings are concerned, which heretofore could only be accomplished by a repeated survey.

The arc, as shown at C, works as in the ordinary Hedley dial, which is fixed at the side, and is easily read when required, and is not in the way at any time. The Hedley swing sights, and also the new vernier plate, may be clamped, and the dial can then be used as an ordinary rigid one. There are many advantages which the excellent construction of this instrument affords, and it is the most complete surveying dial yet introduced. One great advantage of this construction is that if the dial be out of adjustment it is at once detected by comparing the vernier and needle readings. The weight is not increased by the improvement, and the dial is as compact as the ordinary Hedley.

LITHOMARGE.—Mr. J. G. WILLANS, of Bayswater, has patented some improvements in utilising lithomarge, and in apparatus for grinding it and other substances. The inventor describes the use of lithomarge in a finely-divided state as a substitute for fullers' earth in manufactures. Its use in a finely-divided state to mix with pulp for paper or pasteboard, and its use in admixture with lime and the mixture burnt in the manufacture of hydraulic cement. He further describes a rotating apparatus or machine for grinding lithomarge and other mineral, as well as vegetable substances to a fine powder, the fine material being carried out of the machine by means of a current of air applied for the purpose.

NEW PAINT.—Capt. NANGLE, of Bull Point, near Devonport, has patented an improved paint or compound for coating metals, wood, and other substances. The basis of this improved paint is tar from which some of the oils have been extracted, the nature of tar freed from these oils differing materially from that of ordinary tar. This tar is mixed with resin and sulphur, or with shellac or other equivalent for the resin, or with shellac and resin, and in some cases the sulphur may be dispensed with. The mixture is diluted with spirits of turpentine. Paint thus prepared will give a beautiful black enamel appearance to any surface upon which it may be applied, but strong stainers may be added to give it different colours.

PERCUSSIVE ENGINES.—Mr. T. B. JORDAN, mechanical engineer and contractor for mining machinery, of London Wall, has patented an invention which relates to improvements in percussive engines applicable to forging iron and other metals, stamping and crushing minerals, drilling and boring rocks, and similar operations, in which the object is to strike rapidly repeated blows with or without rotary motion of the hammer head or other tool used. The novelty of part of this invention consists in the system of supplying the elastic fluid through the centre of the piston, and alternating its pressure to either side of it without the use of tappet valves or other moving parts, either within or outside the cylinder, and in the application of this construction to the purposes of forging metals, stamping, crushing minerals, boring and drilling rocks, and similar operations. The exhaust steam or condensed air passes out through an aperture in the cylinder body, which is uncovered by the motion of the piston. Another part of the invention relates to methods of giving rotary movements to the drill tool or other instrument employed.

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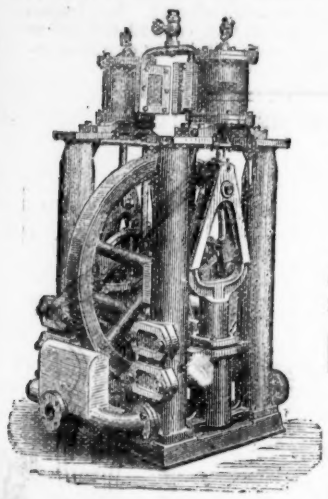

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IMPORTANT NOTICE TO MINE PROPRIETORS.

This company grant licenses, under their patents, for the use, singly or in combination, of the most approved machinery for dressing ores, comprising Stamps Jiggers, Classifiers, and Buddles.

MR. GEORGE GREEN, Mechanical Engineer to the above Company, SUPPLIES MACHINES under the above Company's Patents for DRESSING all METALLIC ORES. Dressing-floors having these Machines possess the following advantages:—

1.—They are cheaper than any other kind in first outlay.
2.—From 60 to 70 per cent. of the labour is saved.
3.—Only about one-fourth of the space usually occupied by dressing-floors is required.
4.—The ore is made clean at one operation, and 5 per cent. of ores otherwise lost is saved.

Drawings, specifications, and estimates will be forwarded on application to—

GEORGE GREEN, M.E., ABERYSTWITH, SOUTH WALES.

EXTRACTS FROM TESTIMONIALS RECEIVED:—

Mr. C. E. BAINBRIDGE, of the London Company's Mines, Middleton-in-Teesdale, by Darlington, writing on the 27th September, 1873, says—"After a full season's experience of the very complete Dressing Machine erected by you at our Colberry Mines, we are fully satisfied with our decision to adopt your patents in preference to all others. The machinery does its work as well as we can desire, and better than we anticipated. We are now getting through 70 tons of orestuff per day, of rich quality. Without your machinery we should have been at a stand still, for we cannot get hands to supply our wants elsewhere. It saves fully one-half of the old wages, and vastly more on the wages we now give, and the saving in ore is not much short of 10 per cent. You can quote from this letter as you think proper."

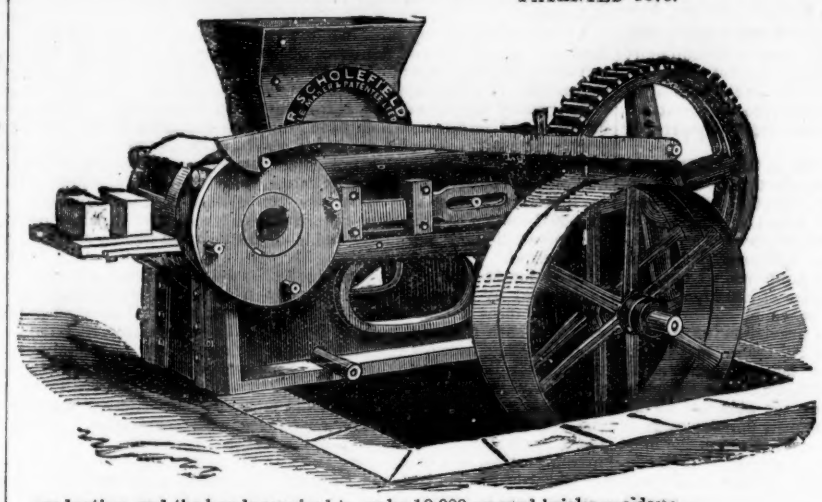
Mr. COULTAS DODSWORTH, of Haydon Bridge, writes, on the 15th January, 1874:—"I have just returned from the Stonecroft and Greyside Mines, where I have seen your 'Patent Ore Dressing Machinery' at work, with which I must say, I was highly pleased. It is decidedly the best machinery I have ever seen for the purpose, the results being as near perfection as possible, and I am quite sure its use in this case will be a very great saving to the company. No large mining establishment should be without your machinery, especially when labour is difficult to procure—a mere fraction of the hands being only required as against the old system, and the work altogether much better done, and a great saving of ore effected. I have heard it said that your machinery is better adapted for poor than for rich ores, but from what I have seen to-day I am quite confident it will do for any kind of ores. I beg not only to congratulate, but also to compliment, you on the great success of your 'Patent Ore Dressing Machinery.' You may use this letter as you think proper."

Mr. MONTAGUE BEALE, Managing Director of the Cagliara Mining Company (Limited), says, on May 15th, 1873:—"I have much pleasure in speaking of the great efficiency of your 'Patent Dressing Machinery,' as erected by you at our mines at Rosas, in the Island of Sardinia. You will remember it has always been considered impossible to dress, or rather separate, the minerals our ores contain by machinery, but our captain assures me he gets a constant return of 76 per cent. of lead with the greatest ease, and I know by the returns we are realising the best market price. I consider this company is much indebted to you for the success you have achieved at so small cost. It may interest you to know, from my experience in several of the British possessions, including the whole of the Australian Colonies, that my opinion is I have never seen any dressing machinery that can efficiently, and at so small a cost, dress, and separate metallic ores, however close the mechanical mixture may be, as yours. You can use this letter in any way you like."

The most satisfactory testimonials also have been received from the GREENSIDE MINE COMPANY, Westmoreland; the TALARGOCH MINING COMPANY, North Wales, and others. Copies of these may be had from Mr. GREEN.

R. SCHOLEFIELD'S
LATEST PATENT BRICK-MAKING MACHINE.

PATENTED 1873.



R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which, instead of storing at the pit's mouth (and making acres of valuable land useless), is at once made into bricks, at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, the following is about the cost of production, and the hands required to make 10,000 pressed bricks per day:—

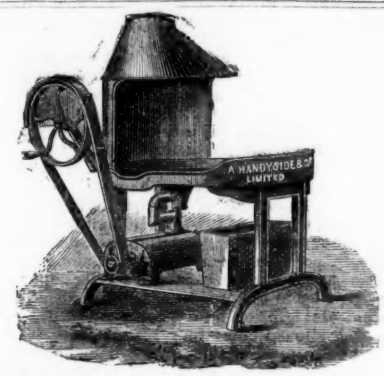
2 men digging, each 4s. per day	£0 8 0
1 man grinding, 4s. 6d. per day	0 4 6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	0 2 0
1 boy greasing, 1s. 6d. per day	0 1 6
1 engine-man, 5s. per day	0 5 0
1 man wheeling bricks from machine to kiln, 4s. per day	0 4 0
Total cost of making 10,000 pressed bricks	£1 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.
As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.

COLUMBA STREET, WOODHOUSE LANE, LEEDS.



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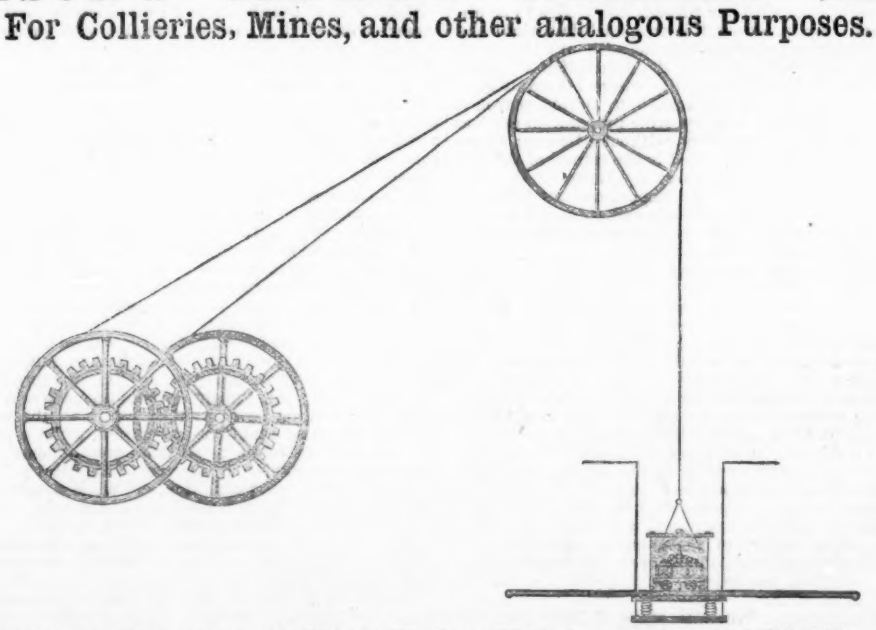
WILSON'S PATENT WINDING GEAR,

For Collieries, Mines, and other analogous Purposes.



The ADVANTAGES of this Patent is to ECONOMISE the WEAR and TEAR of the ROPES and MACHINERY used in drawing or lowering weights in Mines, or any other similar purposes.

At a mere nominal cost this patent can be applied to any or every Mine now in operation, while its application to any new plant will scarcely make any difference in time or cost.

Applications for Licence to use the said Invention can be made to the Patentee,—

R. WILSON, PHŒNIX WORKS, ROTHERHAM.

Full particulars on application can be had as to terms, drawings, &c. &c.